Research Article Impact Factor: 4.226 ISSN: 2319-507X
Shaikh Shujauddin, IJPRET, 2014; Volume 3 (1): 70-76 IJPRET

INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

WIRELESS BODY SENSOR (WBS)

SHAIKH MARIUM SHUJAUDDIN, MOMIN MISBAH MOHD HUSAIN

Assistant Professor, G. M. Momin Womens College, Bhiwandi

Accepted Date: 16/08/2014; Published Date: 01/09/2014

Abstract: Wireless body sensors help users track their daily physical activity while syncing to their Smartphone via mobile app so that they can monitor health progress. With increased connectivity, GEO location and capabilities that can monitor users' physical well-being and even track what their eyes are drawn to, the benefits begin to move beyond the user's Imagination. That Wireless body sensor uses GEO location to target a nearby convenience Medical help. Data is pooled with the data of every other user within a 10-mile radius or depending on Bluetooth coverage. There are few things we consider in our proposed paper how to prepare for the wearable technology and wearable data revolution Understand how your wearable data can complement existing data sources (e.g. mobile, social, Internet and internal systems and embedded sensors in devices, equipment and solutions). Develop scenarios and schemes that address how you will use wearable technology and data to reach your goal. personal data is matter of privacy, security issues should be considered. Wireless body sensors are part of countless medical and fitness devices, it contains an almost out-of-the-box solution for a Bluetooth wireless body sensor system. The kit having 4 chips: *Bluetooth* ® low energy radio-50% less board space, Step-down converter with bypass mode-for reducing power consumption, working with radio, Precision sensor AFE(Analog Front-End)-200 pA Ibias and 335 uW/channel power consumption),Micro-power MCU -battery life can be extended by low power mode of Optimization.

Keywords: Wireless body sensors, GEO, *Bluetooth* ® low energy radio, AFE, Micro-power MCU, embedded sensors, wearable technology

Corresponding Author: PROF. SHAIKH MARIUM SHUJAUDDIN

Access Online On:

www.ijpret.com

How to Cite This Article:

Shaikh Shujauddin, Momin Husain; IJPRET, 2014; Volume 3 (1): 70-76

PAPER-QR CODE

INTRODUCTION

Technology advances in wireless communications and physiological Sensing allow miniature, lightweight, ultra-low power, intelligent monitoring devices, which can be integrated into a Wireless Body Sensor (WBS) for health monitoring. Physiological signals of humans such as heartbeats, temperature and pulse can be monitored from a distant location using tiny biomedical wireless sensors. Hence, it is highly essential to combine the ubiquitous computing with mobile health technology using wireless sensors and smart phones to monitor the well-being of chronic patients such as cardiac, Parkinson and epilepsy patients. Since physiological data of a patient are highly sensitive, maintaining its confidentiality is highly essential. Hence, security is a vital research issue in mobile health applications, especially if a patient has an embarrassing disease. In this paper we are focusing on body sensor which can sense data accurately and can be transferred to other devices like mobile or computers considering the energy and hardware constraints of the wireless body sensors are designed. Performance evaluation of the proposed architecture shows that they can satisfy the energy and hardware limitations of the sensors.

One of the most promising applications of sensor is human health monitoring. There is a critical need for more cost efficient solutions for supervision/monitoring physiological signals of chronic heart patients using wireless body sensor. A number of tiny wireless body sensors, strategically placed on the human body, create a wireless body area that can monitor various vital signs, providing real-time feedback to the user and medical personnel.

Advanced sensors combined with wireless communication can reduce costs, improve monitoring, and better life quality for the patient. The benefit of using wireless sensor technology in health care can be divided into two areas. One area is the use of new technological solutions for individually based, multi-parameter monitoring at home. Patients with chronic diseases, as well as a constantly growing number of seniors, will profit on treatment and medical monitoring in their own environment (e.g., at work or at home). These monitoring systems are linked to individuals rather than places. Almost unlimited freedom of movement implies use of wireless and even implanted sensors that will greatly enhance home monitoring and follow-up. The second area of benefit lies within increasing the efficiency of treatments at hospitals. The cost of continuous monitoring and surveillance is already high and is growing dramatically. This goes for both prior to treatment monitoring, and internally at the hospital, as well as post-monitoring. The wireless body sensors of today are mostly based on hard wiring, in addition to being based on proprietary solutions. Sensors are being embedded into wearable items and accessories that can be carried easily. With the continual improvements to the sensors and the miniaturization of computing devices, these wearable devices for monitoring, diagnosing, and treating illnesses are becoming more readily available and are a key technology in helping the transition to more proactive and affordable health care.

The implementation of more flexible wireless technology will lead to reduced hospitalization time due to more rapid mobilization, as well as improved documentation by stored, digitalized signals. The result will be enhanced decision making for diagnostics, observation and patient treatment has social and financial implications along with providing special care to the aged adults remotely.

Objective

Sensor will sense body temperature, blood pressure, heart beat and store in other mobile devices like mobile, laptop, computer etc. This help individual to monitor the health.

These wearable wireless body sensors allow an individual to closely monitor changes in some ones vital signs and provide feedback to maintain an optimal health status. These data can even alert medical personnel when life-threatening changes occur. Besides, multi-parameter analysis produces new data that can enhance information quality.

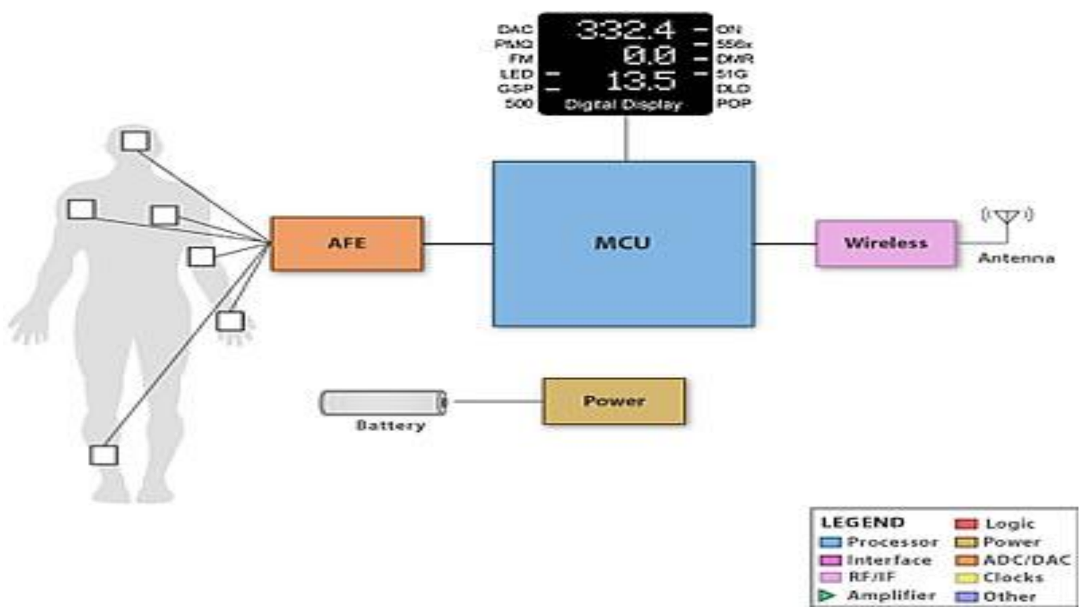
Research Methodology

The Empirical research methodology has been used which relies on experience and observation. It is data-based research, coming up with conclusions that are capable of being verified by observation and experiments. In this research it is necessary to get at facts firsthand, at their source, and actively to go about doing certain things to stimulate the production of desired goal.

Technical Specification

- *Bluetooth* ® low energy radio-50% less board space,
- Step-down converter with bypass mode-for reducing power consumption, working with radio
- Precision sensor AFE(Analog Front-End)-200 pA Ibias and 335 uW/channel power consumption)
- Micro-power MCU -battery life can be extended by low power mode of Optimization.

- Processor 8 MHz MSP430F1611 microcontroller-Processor Performance 16-bit RISC
- Memory 10 KB RAM and 48 KB Flash Memory
- Configuration EEPROM 16 K bytes
- Radio Integrated onboard antenna
- Analog to Digital Converter 12 bit ADC
- Digital to Analog Converter 12 bit DAC
- Transceiver UART(Universal Asynchronous Receiver Transmitter)



Bluetooth low energy radio

The radio front end in this solution is provided by TI's CC2541 2.4GHz low-power Bluetooth SOC. This chip has an 8051 core, either 128kB or 256kB on board flash memory, 8K of ram and many other features and peripherals.

It also has a hardware I2C interface for communication with the MCU. This chip has plenty of flash and ram for applications, plus 23 I/O, a 12-bit ADC and a UART. The low power requirement and small format make this radio front end ideal for use in applications that demand an un-intrusive battery-powered device for measuring vital signs.

Step-down Converter with Bypass Mode

The next building block in the kit is the TPS62730 ultra low-power dc/dc converter for battery applications. This device uses a high-frequency dc/dc converter for low ripple, even with a small output capacitor. The TPS62730 is suitable for use with a variety of Li-primary battery chemistries as well as 2 AA alkaline cells. It also features an ultra low-power bypass mode that can be used when the processor or SOC is in sleep mode. Typical current consumption in bypass mode is 30nA.

This device could be used in any low-power battery-operated design to reduce battery usage while providing reliable power to your circuit. The bypass mode allows you to get maximum life out of the batteries used. Due to its battery-stretching characteristics this chip would be ideal for wearable body sensing applications.

Precision Sensor AFE

The ADS1292 low-power, 2-channel, 24-bit analog front end was designed specifically for medical and sports/fitness applications. It incorporates two low-noise PGAs and two high-resolution ADCs.

Power consumption is only 335 uW/channel. Data rates can range from 125 SPS to 8 kSPS. Gain is programmable to 1,2,3,4,6,8 or 12. The ADS1292 includes a built-in oscillator and reference. It features flexible power-down with a standby mode for when the processor is asleep. Communications with the MCU is accomplished via a SPI compatible serial interface.

This unit's low noise characteristics and high accuracy make this chip well suited for medical body sensing device design.

Micro-power MCU

The MCU chosen for this solution is TI's MSP430F5308, an ultra-low-power microcontroller with 16KB flash and 6KB SRAM. It features a 3.3V LDO, four 16-bit timers, two universal serial communication interfaces (USCI), hardware multiplier, DMA, and real-time clock module with alarm capability.

The MSP430F5308 also has 47 GPIO pins, providing plenty of IO to interface to control and display circuitry. Maximum clock frequency is 25MHz and the MCU features a watchdog timer, real-time clock and brownout reset. It also features a temp sensor and a 10-bit,12 channel ADC.

The low power requirements and superior processing capability of this MCU make it a natural complement to round out this near out-of-the-box wireless body sensing solution.

Limitation:

Wireless body sensor has a few inherent limitations. With limited hardware, limited transmission range, the sensors in WBS s are equipped with special sensing modules such as an electrocardiogram, pressure or temperature sensor. These sensors are fitted at different parts of a patient in form of a smart suit and transmit data to a mini gateway node located within the same smart suit. This mini gateway node is responsible for organizing and forwards the data to the final destination with higher storage and processing capabilities. There should be having urgent need to protect confidential data.

Suggestions/ Strategies:

Ultra-low-power operation and small size ideal for wearable wireless body sensor can be used to implement a highly-accurate system with less design and development time

CONCLUSIONS

The main motivation to design sensor which should be light weight in terms of computation and memory storage so that less amount of energy should be consumed in implementing them. for realization of an Health application and design light weight, low complexity data confidential and user authentication schemes for the WBS

REFERENCES

1. Implementing e-Health in Developing Countries. Available online: http://www.itu.int/ITUD/cyb/app/docs/e-Health-prefinal-15092008.PDF (accessed on 8 March 2012).

2. US Edge. An IT Resource You can Trust. Available online: http://www.mobih.org/ (accessed on 8 March 2012).

3. Alonso, J.V.; Matencio, P.L.; Castano, F.J.G.; Hellin, H.N.; Guirao, P.J.B.; Martinez, F.J.P.; Alvarez, R.P.M.; Jimenez, D.G.; Castineira, F.G.; Fernandez, R.D. Ambient intelligence systems for personalized sport training. Sensors 2010, 10, 2359–2385.

4. Chakravorty, R. A Programmable Service Architecture for Mobile Medical Care. In Proceedings of the 4th Annual IEEE International Conference on Pervasive Computing and Communication Workshop (PERSOMW ’06), Pisa, Italy, 13–17 March 2006.

5. Malasri, K.; Wang, L. Design and implementation of secure wireless mote-based medical sensor network. Sensors 2009, 9, 6273–6297.

6. Malasri, K.; Wang, L. SNAP: An Architecture for Secure Medical Sensor Networks. In Proceedings of the 2nd IEEE Workshop on Wireless Mesh Network, Reston, VA, USA, 25–28 September 2006; pp. 160–162.

7. Douceur, J.R. The Sybil Attack. In Proceeding of the 1st International Workshop on Peer-to Peer Systems, Cambridge, MA, USA, 7–8 March 2002.

8. Huang, Y.M.; Hsieh, M.Y.; Hung, H.C.; Park, J.H. Pervasive, secure access to a hierarchical sensor-based healthcare monitoring architecture in wireless heterogeneous networks. IEEE J. Sel. Areas Commun. 2009, 27, 400–411.